C 73/5

01

STUDENT EVALUATIONS
DEMOLITIONS

NEWARK PUBLIC LIBRARY
MAY 14 1986
U. S. GOVT. PUBS.
DEPOSITORY 378

MOS 12B
COMBAT ENGINEER
SKILL LEVEL I

PREPARED BY
UNITED STATES ARMY ENGINEER SCHOOL
FORT BELVOIR, VIRGINIA 22060

FOR
U.S. ARMY RESERVE SCHOOLS

U.S. ARMY TRAINING SUPPORT CENTER
RESERVE SCHOOLS DIVISION
FORT EUSTIS, VA 23604

D 103.2:

STUDENT EVALUATION

DEMOLITIONS

Management Instructions

This booklet contains the written test requirements, the student answer sheets for the written test and hands-on test evaluation sheets for lessons of the Demolitions Cluster. The test, student answer sheets, and student evaluation sheets are attached as Annexes A through I. This booklet is to be dismantled and the test material locally reproduced in the quantities necessary to satisfy testing requirements. The test materials contained in this booklet are indicated in the Table of Contents below.

Access to this material is restricted to management personnel prior to actual testing. During hands-on testing, management personnel are to observe students as they perform the test and record their actions on the evaluation sheets. Management instructions are contained at the beginning of each student test, student answer sheet, or student evaluation sheet.

TABLE OF CONTENTS

Lesson	Lesson Title	Test Type	Annex	Page Numbers
01-01	Identify and Maintain Demolition Equipment	Written	A	A-1 thru A-11
	Student Answer Sheet		A-I	A-I-1
01-02	Prepare a Non-electric Firing System (Part I)	Written	B	B-1 thru B-10
	Student Answer Sheet		B-I	B-I-1 thru B-I-
	Prepare a Non-electric Firing System (Part II)	Hands-on	C	C-1 thru C-3
01-03	Prepare an Electric Firing System (Part I)	Written	D	D-1 thru D-7
	Student Answer Sheet		D-I	D-I-1
	Prepare an Electric Firing System (Part II)	Hands-on	E	E-1 thru E-3

Lesson	Lesson Title	Test Type	Annex	Page Number
01-04	Prepare a Detonating Cord Firing System (Part I)	Written	F	F-1 thru 10
	Student Answer Sheet		F-I	F-I-1
	Prepare a Detonating Cord Firing System (Part II)	Hands-on	G	G-1 thru G-2
01-05	Prepare a Dual Firing System	Written	H	H-1 thru H-5
	Student Answer Sheet		H-I	H-I-1
01-06	US Firing Devices	Hands-on	I	I-1 thru I-16

ANNEX: A

STUDENT TEST

TASK #051-193-1001 Identify and Maintain Demolition Equipment

POI NO. 01-01

WARNING: Access to this material is restricted to management personnel prior to actual student testing. Students are not to write in this test booklet or keep this booklet after testing has been completed. Student responses are to be recorded on the student answer sheet.

TEST INSTRUCTIONS

This test consists of two parts. The first part is multiple choice questions, and the second part is true/false questions.

Section I - is the multiple choice section. You will refer to a picture of an item of Demolition Equipment. Each question will have four (4) possible answers. You are to select the correct answer and circle that letter on the answer sheet. Then select the letter which best answers the use of the tool and circle that letter on the answer sheet.

SECTION I

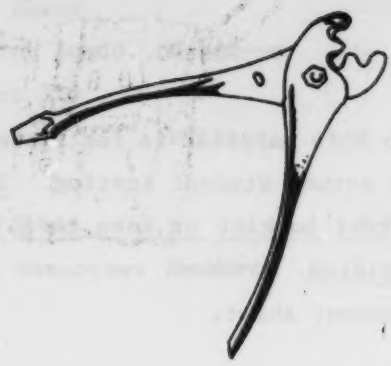


FIGURE 1

1. This item is a:

   a. Cap Crimper
   b. Priming Adapter
   c. D Cord Clip
   d. Multipurpose Tool

This item is used (two answers are required):

   a. To connect firing wires.
   b. To crimp blasting caps.
   c. To pry open crates of explosives.
   d. To cut time fuse and detonating cord.

FIGURE 2

2. This item is a:

   a. Cover for the Blasting Machine
   b. Sandbag
   c. Back Pack
   d. Carrying Bag

This item is used to carry (two answers are required):

   a. The firing wire reel
   b. Sand for Tamping Charges
   c. Explosives
   d. The Blasting Machine

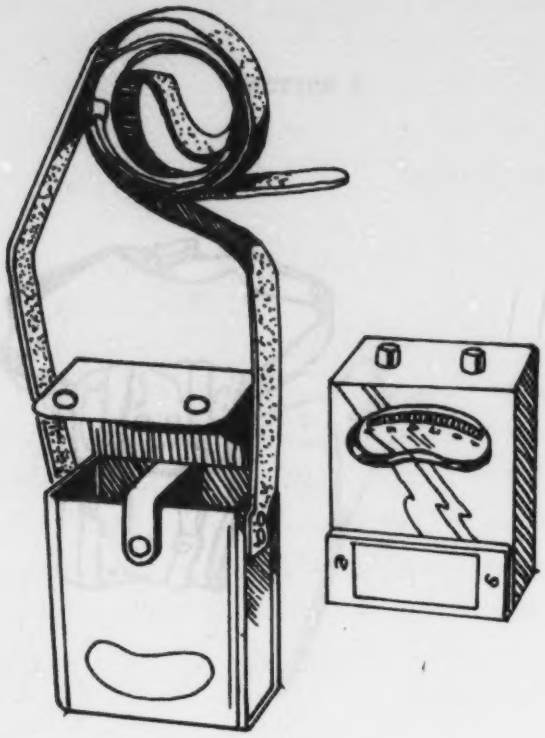


FIGURE 3

3. This item is a:

   a. Voltmeter
   b. Blasting Galvanometer
   c. Ten Cap Blasting Machine
   d. Blasting Cap Test Set

This item is used to:

   a. Detonate blasting caps.
   b. Test the explosives.
   c. Check the electrical firing circuit.
   d. Check batteries to see if they are good.

READEX FICHE best copy available

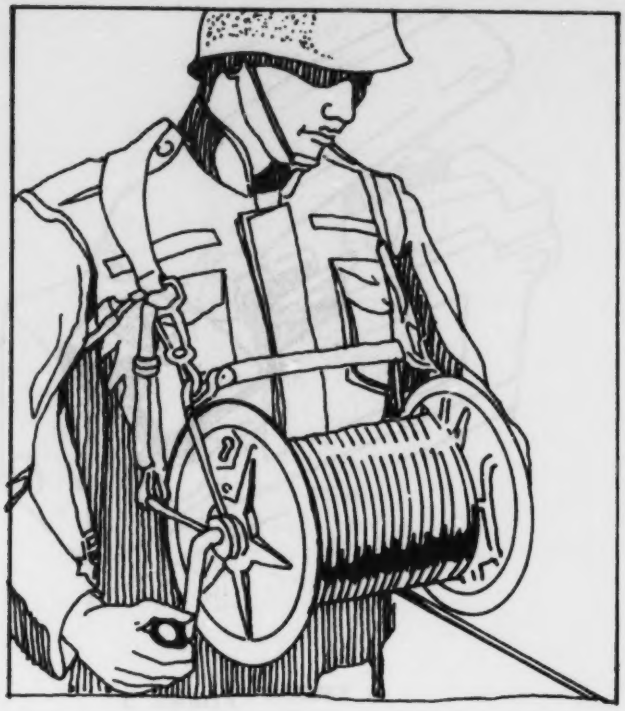


FIGURE 4

4. This item is a reel of:

   a. Detonating Cord
   b. Firing Wire
   c. Annuciator Wire
   d. Time Fuse

This item is used when you:

   a. Connect more than one explosive charge.
   b. Detonate explosives electrically.
   c. Detonate explosives non-electrically.
   d. Lay out detonating cord.

FIGURE 5

5. This item is a:

   a. Priming Adapter
   b. Blasting Cap Holder
   c. Detonating Cord Clip
   d. Priming Cord Clip

This item is used to:

   a. Secure blasting caps to sheet explosives.
   b. Secure blasting caps in explosives.
   c. Connect two pieces of detonating cord.
   d. None of the above.

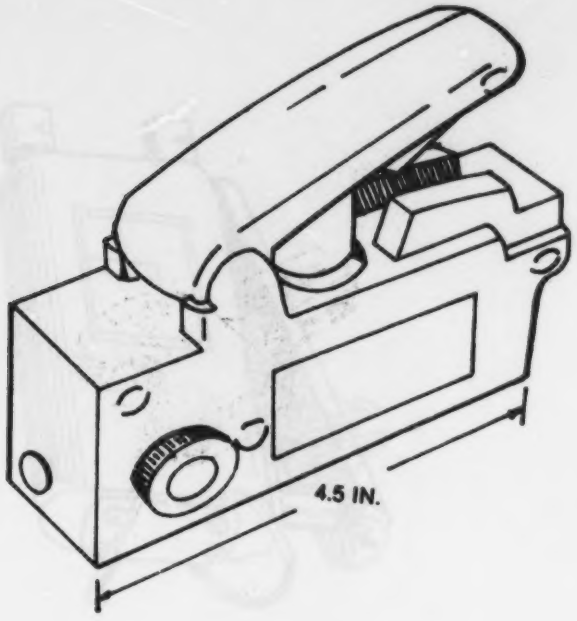


FIGURE 6

6. This item is a:

a. Ten Cap Blasting Machine
b. Blasting Galvanometer
c. Blasting Cap Test Set
d. Priming Adapter

This item is used to:

a. Check the galvanometer.
b. Detonate electric blasting caps.
c. Connect blasting caps to detonating cord.
d. Testing electrical firing circuits.

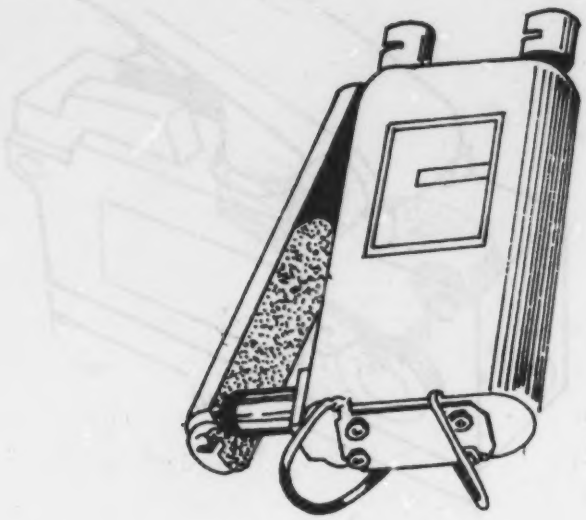


FIGURE 7

7. This item is a:

a. Blasting Cap Test Set
b. M32 Blasting Machine
c. Blasting Galvanometer
d. Priming Adapter

This item is used to:

a. Detonate electric blasting caps.
b. Test blasting caps.
c. Check electric firing wire.
d. Check annuciator wire.

FIGURE 8

8. This item is a:

a. Detonating Cord Clip
b. Blasting Cap Holder
c. Priming Adapter
d. Standard fuse well

This item is used to:

a. Connect two pieces of detonating cord.
b. Hold blasting caps in a standard fuse well.
c. Cut detonating cord.
d. Cut time fuse.

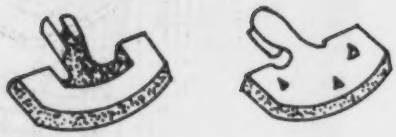


FIGURE 9

9. This item is a:

   a. Priming Adapter
   b. Blasting Cap Holders
   c. Detonating Cord Clips

This item is used to:

   a. Hold together two pieces of detonating cord.
   b. Cut time fuse and detonating cord.
   c. Hold blasting caps in standard fuse wells.
   d. Attach blasting cap to sheet explosives.

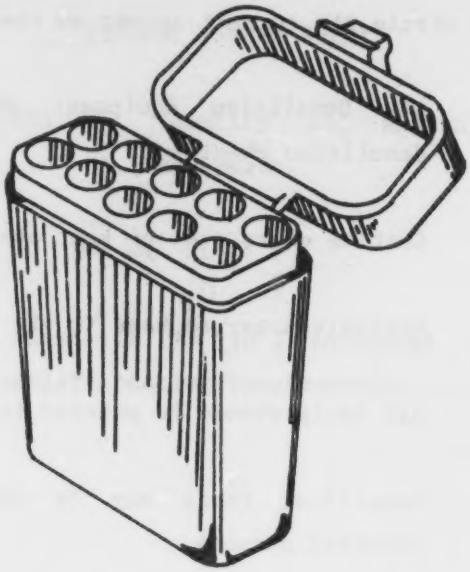


FIGURE 10

10. This item is a:

    a. Blasting Galvanometer
    b. Cap Box
    c. Blasting Machine
    d. Priming Adapter

This item is used to:

    a. Store non-electric blasting caps.
    b. Detonate non-electric caps.
    c. Check non-electric caps.
    d. Check firing wire.

SECTION II

This section of the test is the TRUE/FALSE Section. Read the question and circle the correct answer on the Answer Sheet.

1. T F All Demolition Equipment should be stored in the demolition chest.

2. T F Cutting edges must be kept sharp.

3. T F Explosives may be kept in the demolition chest.

4. T F All tools should be painted to stop rust.

5. T F Demolition tools may be used for other than their intended purpose.

6. T F Canvas items should be cleaned with a stiff brush.

7. T F Broken tools are to be stored in the demolition chest until they can be replaced.

8. T F Any 9 volt battery may be used in the blasting galvanometer.

9. T F The blasting machine is used to detonate explosives non-electrically.

10. T F Cap crimpers are made of non-sparking metal and do not conduct electricity.

12B3/C

ANNEX A-I

STUDENT ANSWER SHEET

TASK #051-193-1001 Identify and Maintain Demolition Equipment

POI NO. 01-01

NOTE: This answer sheet is to be reproduced in sufficient quantities to satisfy testing requirements.

_____ _____

(Date) (Student's Name)

Answer Sheet
Identify and Maintain Demolition Equipment

SECTION I
(Circle the letter that represents the correct answer)

	Name				Use			
1.	a	b	c	d	a	b	c	d
2.	a	b	c	d	a	b	c	d
3.	a	b	c	d	a	b	c	d
4.	a	b	c	d	a	b	c	d
5.	a	b	c	d	a	b	c	d
6.	a	b	c	d	a	b	c	d
7.	a	b	c	d	a	b	c	d
8.	a	b	c	d	a	b	c	d
9.	a	b	c	d	a	b	c	d
10.	a	b	c	d	a	b	c	d

SECTION II
(Circle T for True and F for False)

1.	T	F	6.	T	F
2.	T	F	7.	T	F
3.	T	F	8.	T	F
4.	T	F	9.	T	F
5.	T	F	10.	T	F

When you have all questions answered, see the manager for grading.

12B3/E

ANNEX: B

STUDENT TEST

(PART I)

TASK #051-193-1002 Prepare a Non-Electric Firing System

POI NO. 01-02

WARNING: Access to this material is restricted to management personnel prior to actual student testing. Students are not to write in this test booklet or keep this booklet after testing has been completed. Student responses are to be recorded on the student answer sheet.

Test Instructions

For

Prepare a Non-Electric Firing System

Manager/Instructors: Give the student the test booklet and answer sheet.

When the student has completed the test, you must grade it and rate the student GO or NO-GO. A GO is given when a student correctly answers 11 or more questions. A GO student will be issued the inert material to prepare a non-electric firing system.

NO-GO ratings are issued to students who correctly answer less than 11 questions. NO-GO students should be directed to restudy this lesson.

PRE/POST-TEST

HOW TO PREPARE A NON-ELECTRIC FIRING SYSTEM

(Do Not Write On This Paper)

This Pretest/Posttest consists of fifteen questions and will test the training objective of the lesson. Write your answer on the answer sheet. After completing the Pretest/Posttest, take the test booklet and answer sheet to the manager.

1. Here are the main steps in preparing a non-electric firing system. Put them in the correct order. Write out the words, do not use the letters.

   a. Install and crimp cap.

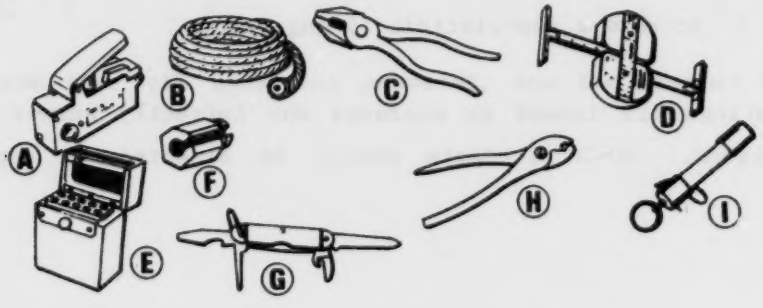
   b. Time and fuse burn.

   c. Prime the charge.

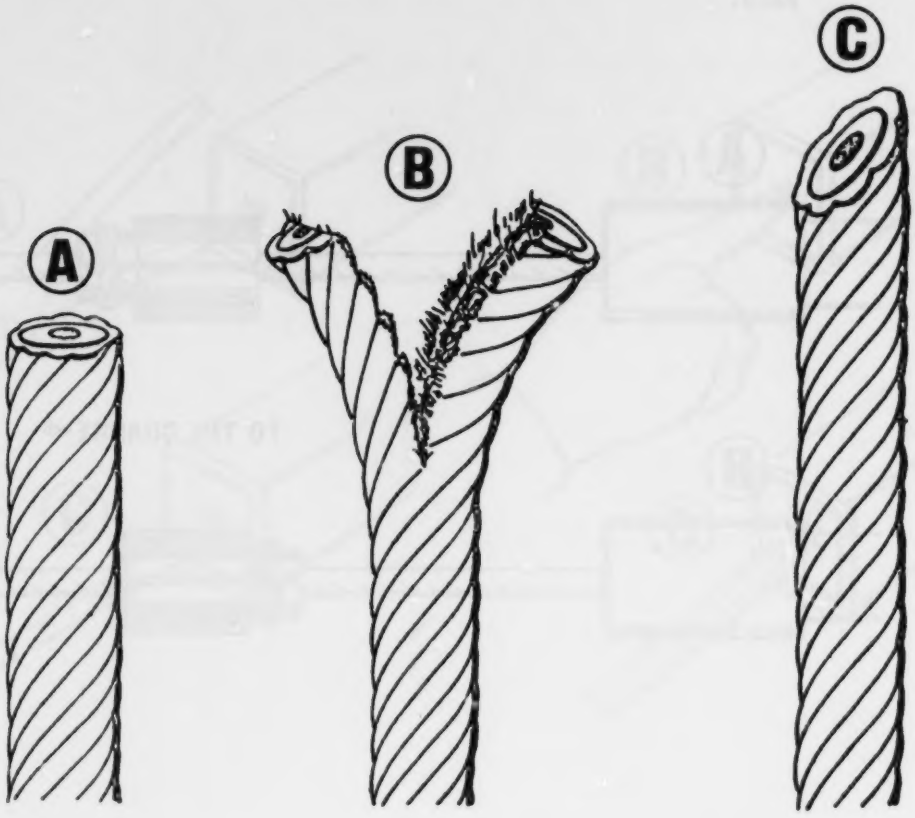
   d. Inspect the cap.

   e. Prepare charge.

2. Which of the <u>items</u> shown below do you need to prepare a non-electric firing system? Select and write the name of each item. DO NOT LIST THE LETTERS.

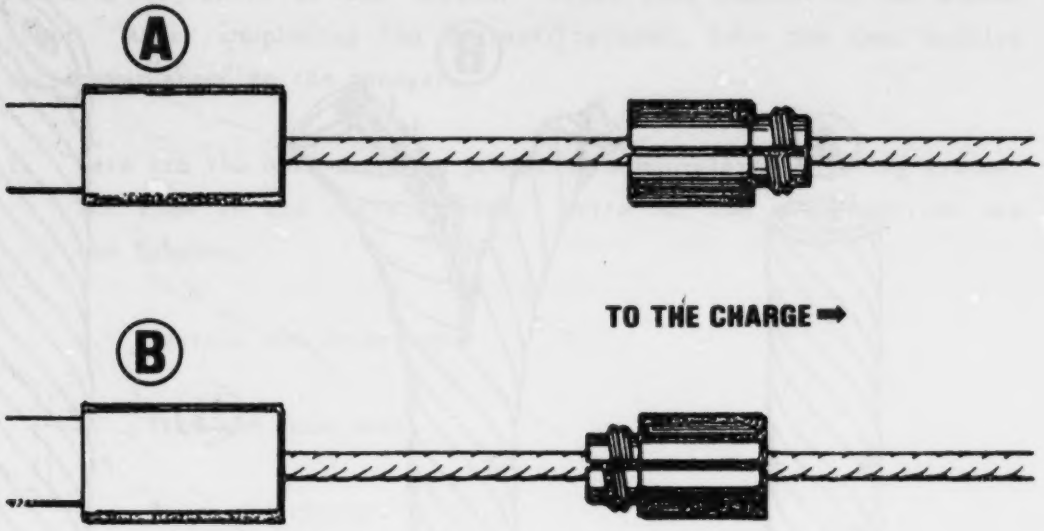


3. Which of the three pictures show the correct way to cut a fuse? Write the letter on your answer sheet.

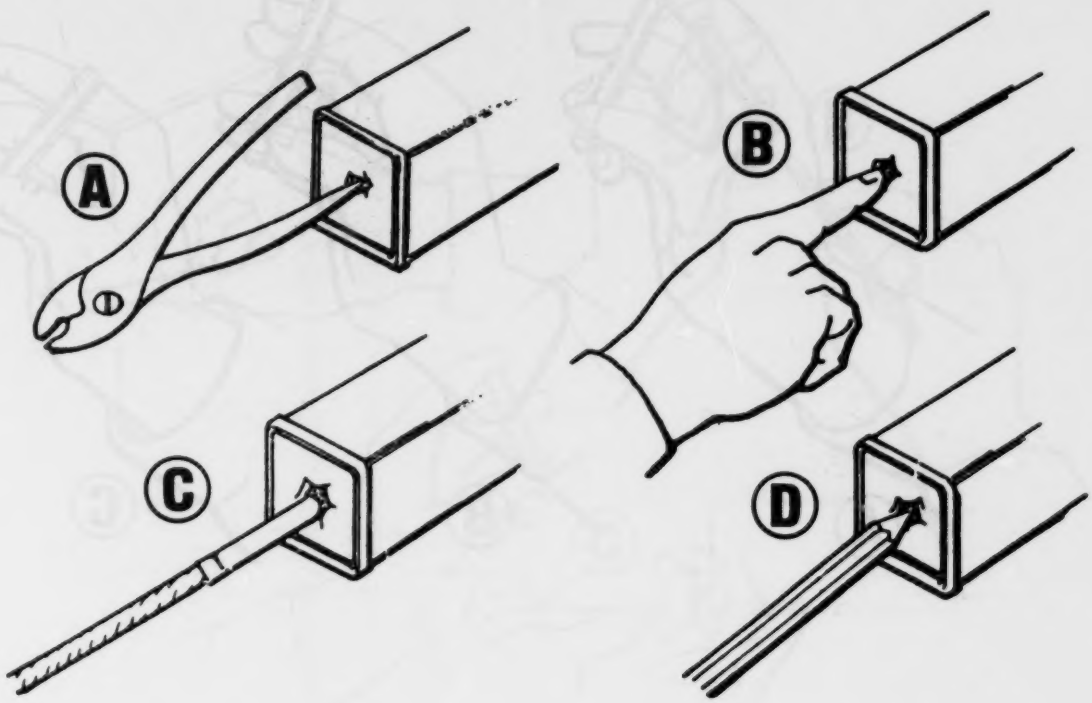


4. Suppose you have test burned your fuse and it burns three feet in 120 seconds. How much fuse do you need for a six minute burn?

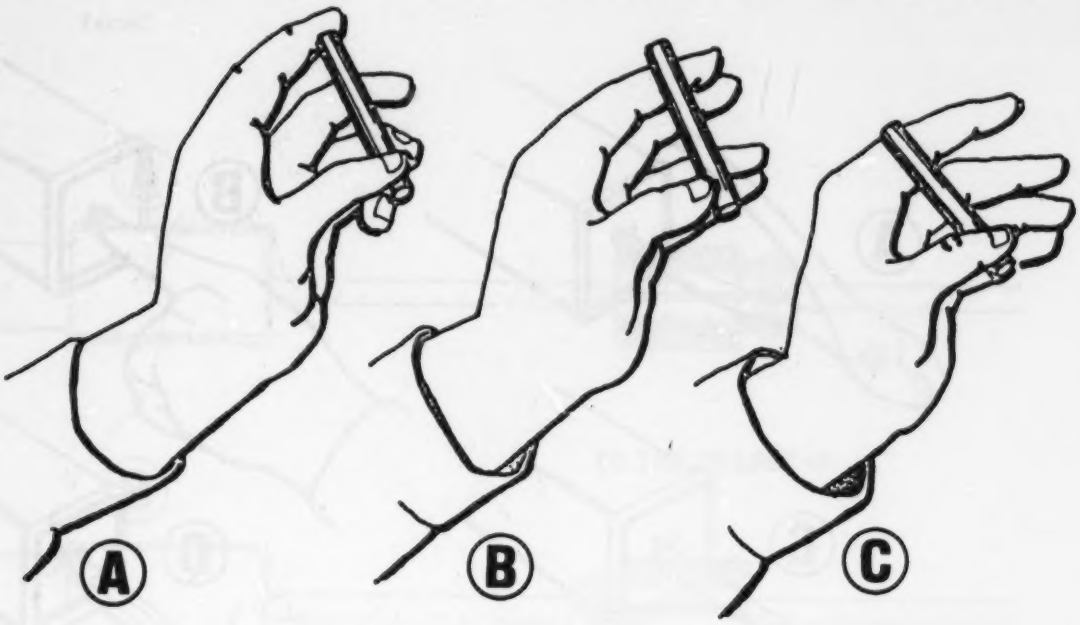
5. When installing the priming adapter, which way should the threads face?



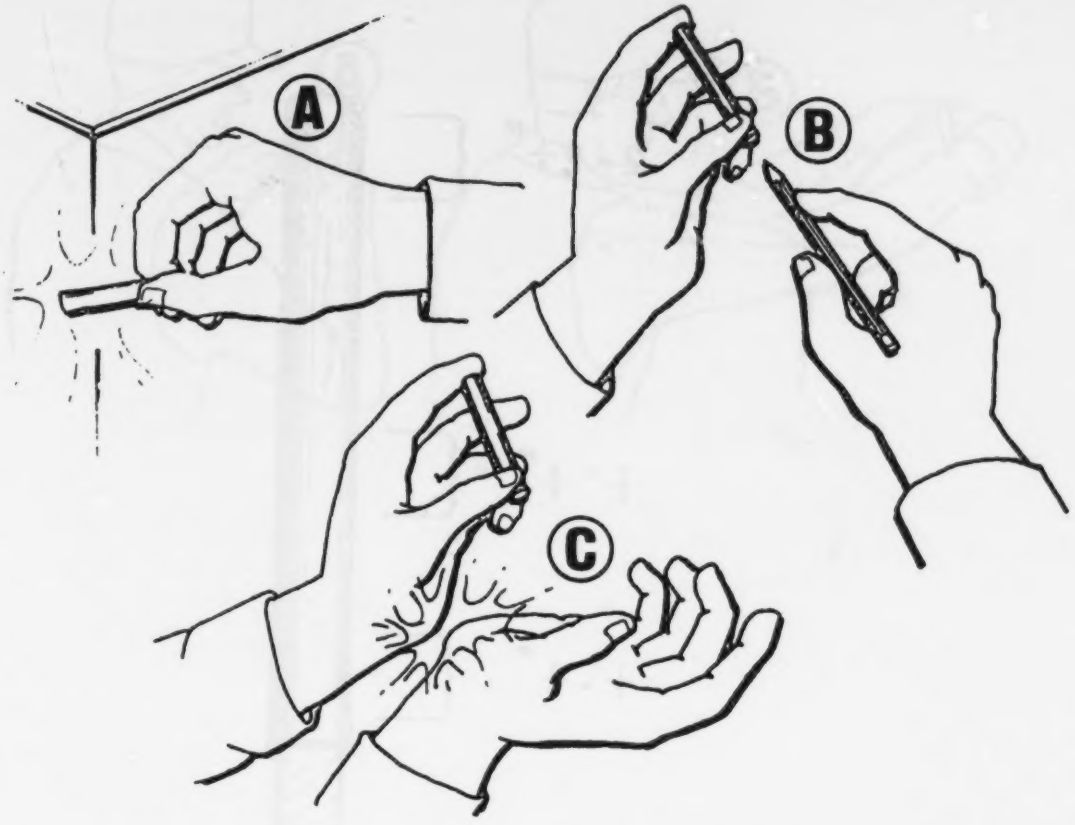
6. Which is the correct way to form a cap-well in a charge that doesn't have one?



7. How do you hold the blasting cap to inspect it?

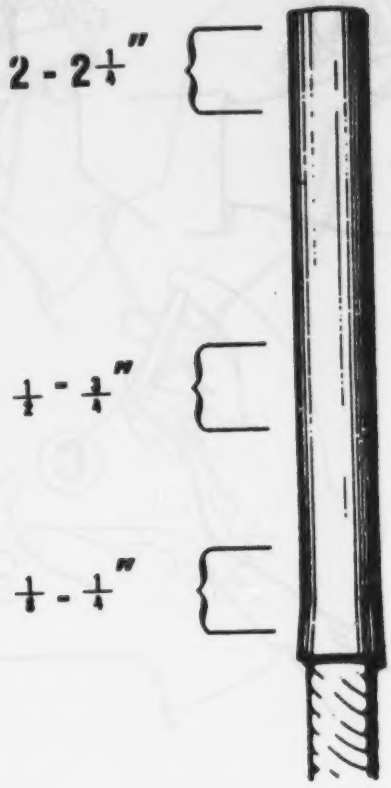


8. Which of the three methods shown below is the correct way to remove dirt or debris from the open-end of a blasting cap?



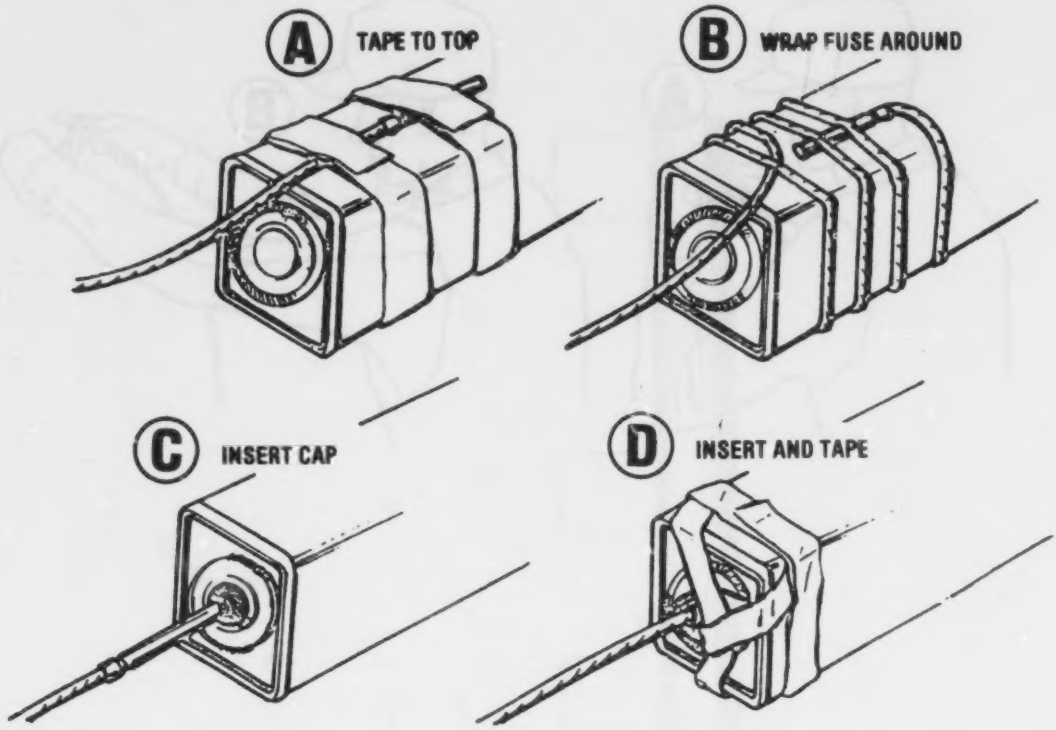
9. How far from the charge must you be when you crimp the blasting cap to the time fuse?

10. Where do you crimp the blasting cap?



11. Which of the two methods shown below is the correct method of holding the blasting cap and time fuse while crimping?

12. How do you prime a charge, if you don't have a priming adapter?



13. Before you pull (fire) your shot (charge) what warning do you give?

14. What three things must you do if the fuse igniter doesn't light the fuse?

15. How long must you wait before investigating a misfire?

12BR1/P

ANNEX B-I

STUDENT ANSWER SHEET

(PART I)

TASK #051-193-1002 Prepare a Non-Electric Firing System

POI NO. 01-02

NOTE: This answer sheet is to be reproduced in sufficient quantities to satisfy testing requirements.

_____ _____

(Dete) (Student's Name)

STUDENT ANSWER SHEET

for

PREPARE A NON-ELECTRIC FIRING SYSTEM

Print your name _____

Date _____

Write answers in spaces below. Read the instructions carefully.

1. _____

_____

_____

_____

_____

2. _____

_____

_____

_____

_____

_____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

STANDARD: The student is scored GO if he correctly answers 12 or more questions. If the student receives a NO GO, tell him why and mark his scoresheet accordingly. NO GO students must rework the lesson and receive a GO on this test, prior to being allowed to proceed to the practical exercise part of the test.

GO NO-GO

_____

Manager's Signature

12BR1/W

ANNEX: C

STUDENT TEST

(PART II HANDS-ON)

TASK # 091-193-1002 Prepare a Non-Electrical Firing System

POI NO. 01-02

THIS TEST IS TO BE REPRODUCED LOCALLY

WARNING: Access to this material is restricted to management personnel prior to actual student testing.

_____ _____

(Date) (Student's Name)

STUDENT TEST - NON-ELECTRIC FIRING SYSTEM

INSTRUCTIONS TO THE STUDENT: The scorer will read these exact words aloud:

"LET ME HAVE YOUR ATTENTION. AT THIS STATION, YOU ARE TO INSTALL AND RECOVER A NON-ELECTRICAL FIRING SYSTEM. ALL EQUIPMENT YOU WILL NEED TO PERFORM THE TASK IS ON HAND AND IN GOOD WORKING CONDITION. YOU HAVE 15 MINUTES TO PREPARE THE FIRING SYSTEM. TELL ME WHEN YOU HAVE COMPLETED THE TASK. IF YOU HAVE NOT COMPLETED THE TASK IN 15 MINUTES, YOU WILL BE RATED NO-GO. I WILL TELL YOU WHEN THE TIME IS UP. I CANNOT HELP YOU IN ANY WAY EXCEPT TO EXPLAIN WHAT IS REQUIRED" (Pause) "DO YOU UNDERSTAND WHAT IS REQUIRED?" (If the student does not understand, repeat the instructions. If the student still does not understand, tell him to restudy the lesson.) Pause at least 5 seconds then say, "YOU HAVE 15 MINUTES TO INSTALL THE NON-ELECTRIC FIRING SYSTEM WHEN I GIVE THE COMMAND, BEGIN". Begin timing when you give the command. If the student has not completed the task within 10 minutes, tell him he has 5 minutes left. If he has not completed the test within 15 minutes, announce loudly enough for him to hear "STOP", have him restudy the lesson. If the student finishes the test within the allotted time and otherwise receives a GO, direct him to the next lesson.

TASK: Prepare a Non-Electric Firing System.

STUDENT GRADING SHEET

The following performance measures will be used to evaluate student performance during the preparation of a non-electric firing system. Observe students actions and record their performance.

PERFORMANCE MEASURE	PERFORMANCE YES	PERFORMANCE NO
1. Time fuse burn		
a. Cut approximately 6 inches from the end of the time fuse (cut from end to be used).	_____	
b. Measure and cut 3 feet of time fuse (fuse must be accurate plus or minus 1/8 inch, ends must be cut square).	_____	
c. Attach fuse igniter to time fuse.	_____	
d. Time fuse burn (plus or minus, 5 seconds).	_____	
e. Correctly calculate length of fuse required for 2 minute burn.	_____	
f. Cut length of fuse for 2 minute burn (not to be graded as part of this performance measure).	_____	
2. Prepare Charge		
a. Install priming adapter.	_____	
b. Attach ignitor to fuse.	_____	
3. Inspect the blasting cap.	_____	
4. Crimp and install blasting cap.		
a. Hold cap and fuse properly.	_____	
b. Crimp cap to time fuse (1/4 to 1/8 inch from top of cap).	_____	

5. Prime the charge, (place and secure blasting cap and priming adapter into explosives). _____

STANDARDS: Student is scored GO if he has a YES response to all the performance measures. A NO to any performance measure will result in the student receiving a NO-GO for the test. If a student receives a NO-GO, tell him why and record on the scoresheet any additional information required to show the cause of the NO-GO.

GO NO-GO

Reason(s) for the NO-GO _____

_____

_____

_____
Manager's Signature

12B1/0

ANNEX: D

STUDENT TEST
(PART I)

TASK #051-193-1004 Prepare an Electrical Firing System

POI NO. 01-03

WARNING: Access to this material is restricted to management personnel prior to actural student testing. Students are not to write in this test booklet or keep this booklet after testing has been completed. Student responses are to be recorded on the student answer sheet.

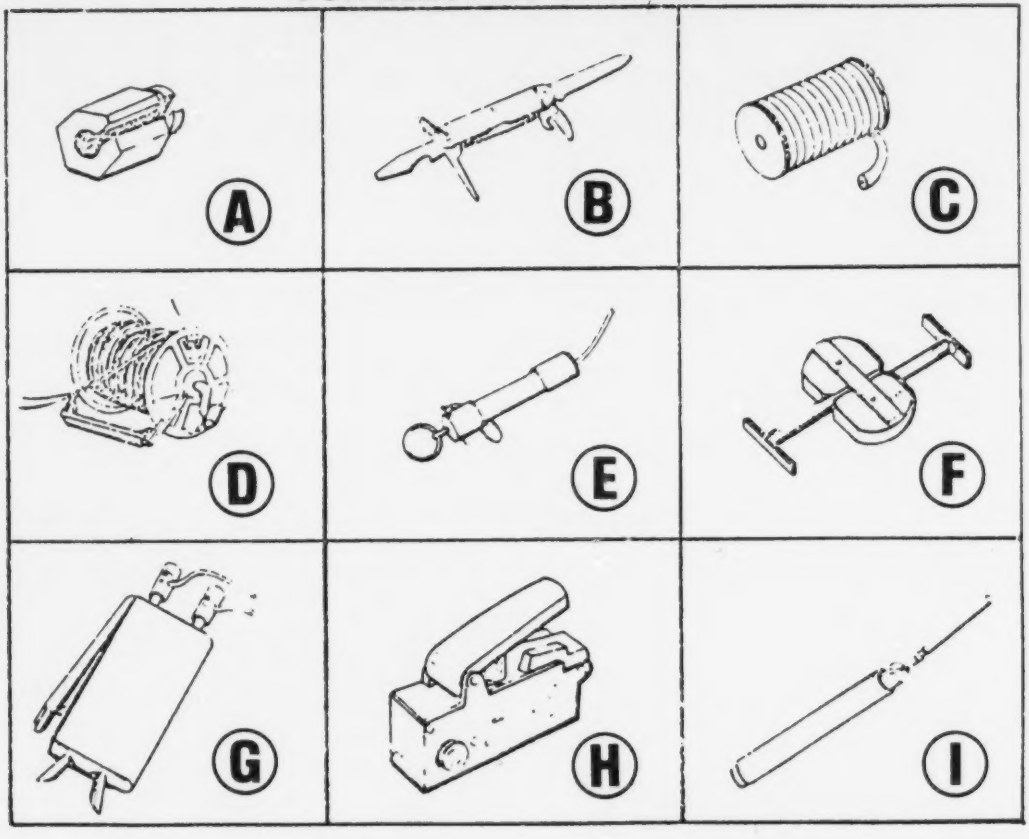
HOW TO PREPARE AN ELECTRIC FIRING SYSTEM

(Do Not Write On This Paper)

This Pre/Posttest consists of 10 questions and will test the training objective of the lesson. Write your answers on the answer sheet. After completing the Pre/Posttest, take the test booklet and answer sheet to the manager.

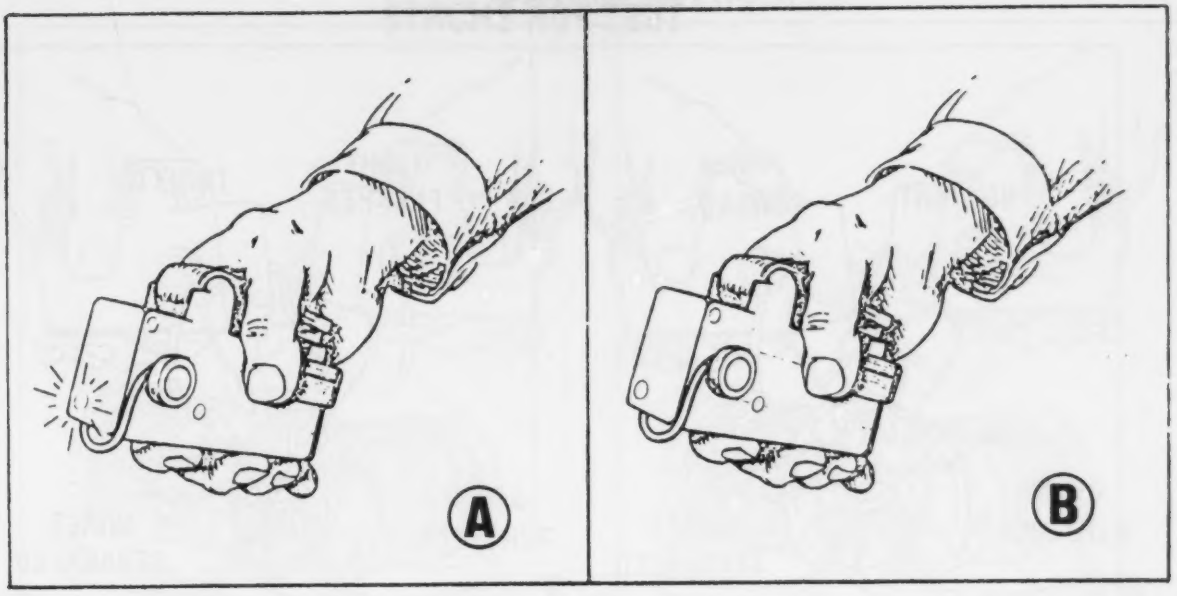
1. Which of the items, shown below, do you need to prepare an electric firing system? Write out the words; do not use the letter.

FOR ELECTRIC SYSTEM?

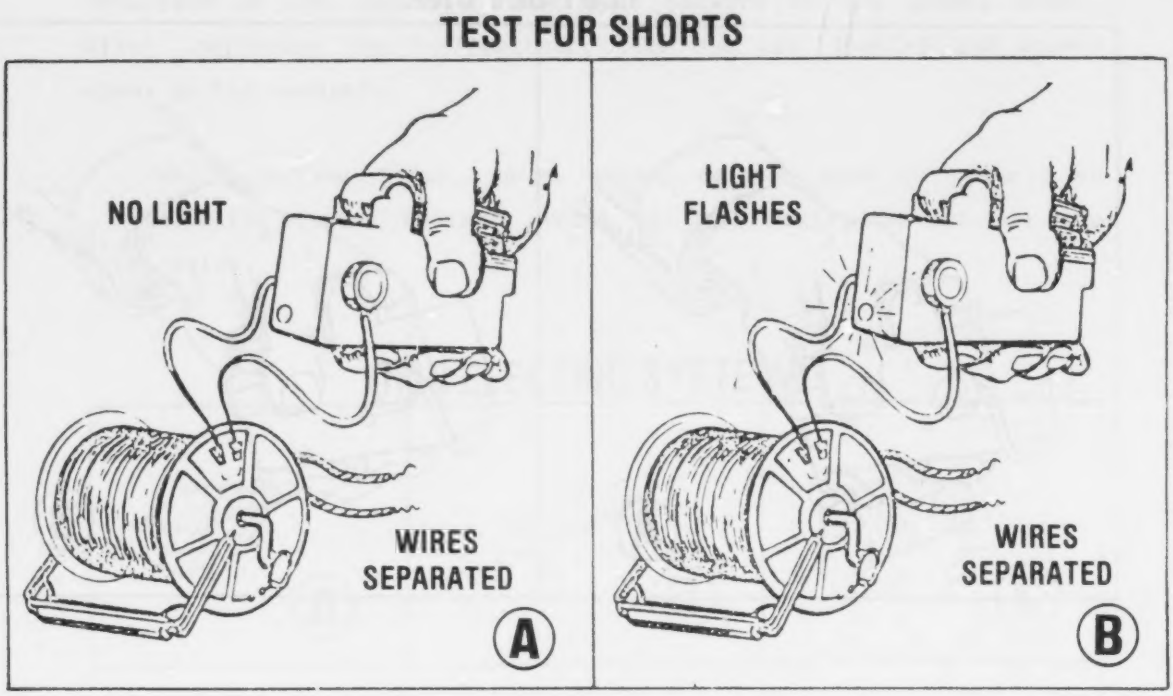


2. Which picture indicates a good test set?

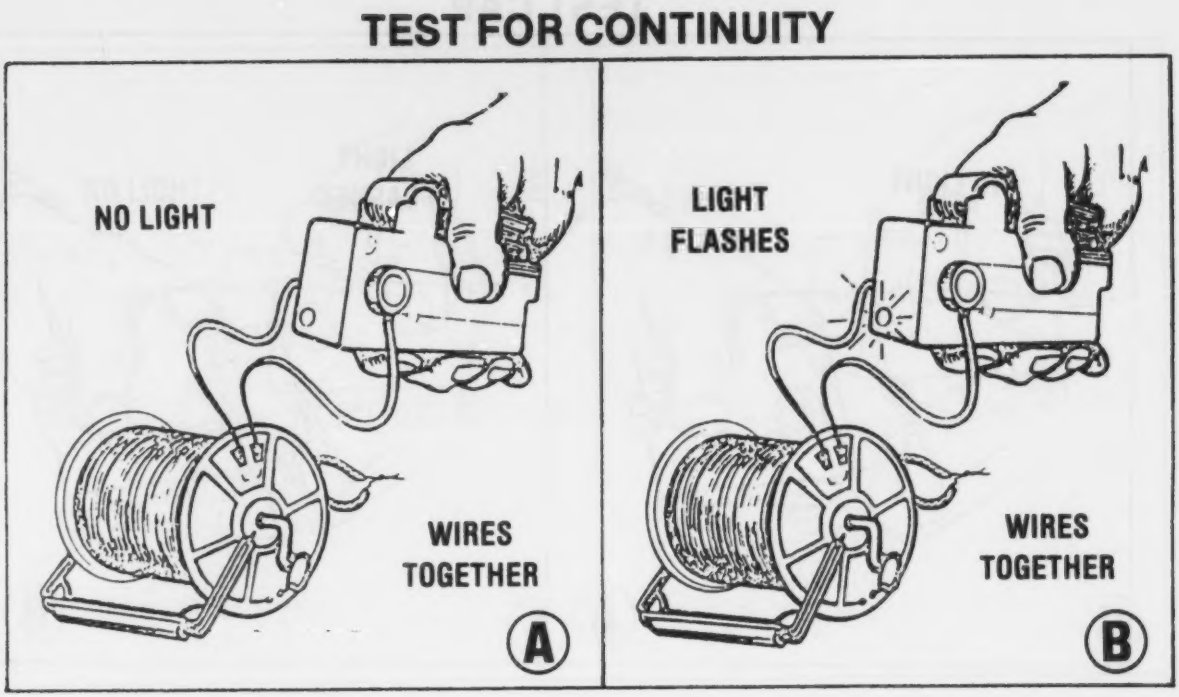
TEST SET OK?



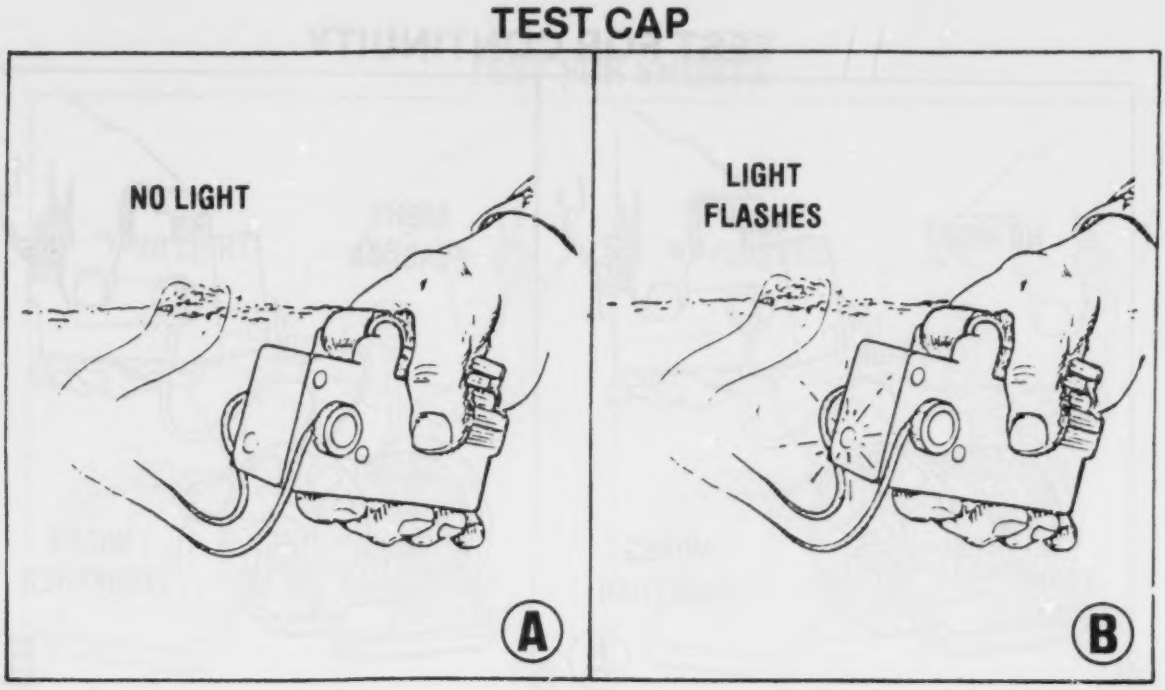
3. When you test the firing wire for shorts, which test indicates a good wire?



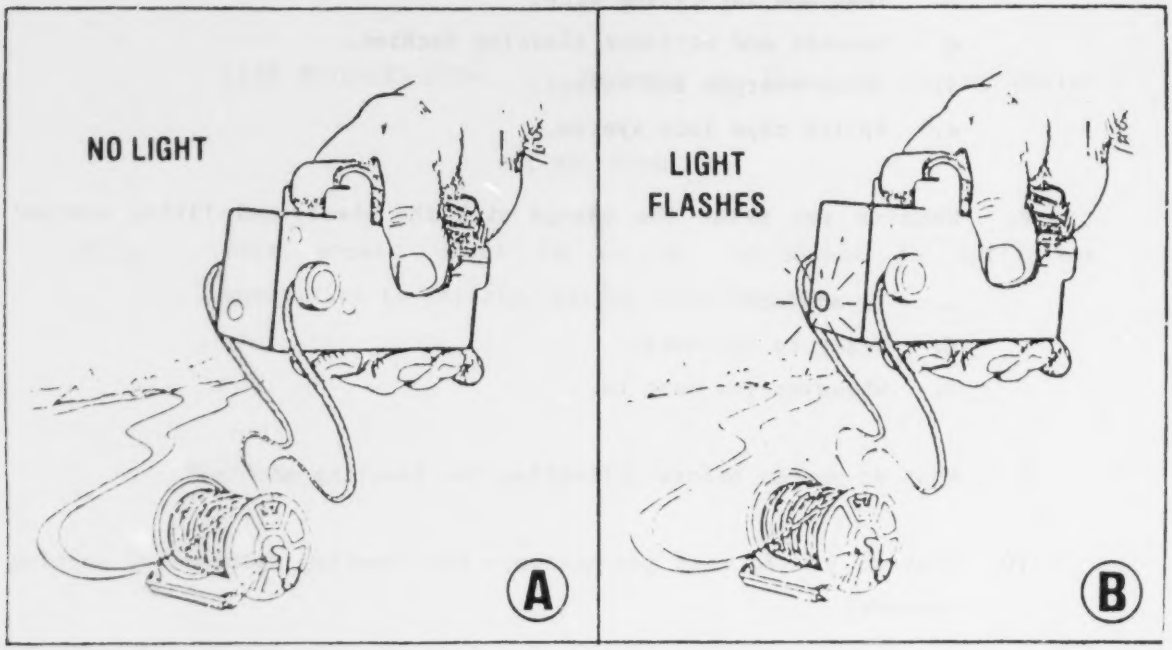
4. Which test indicates a good wire when testing for continuity?



5. Which picture shows a successful test of an electric blasting cap?



6. Suppose you've primed the charge and are retesting for continuity. Which indication should you get?



7. Here are the main steps in preparing an electric firing system. Put them in the correct order. Write out the words, do not use the letters.

   a. Test blasting caps.
   b. Test and lay firing wire.
   c. Connect and activate blasting machine.
   d. Prime charges and retest.
   e. Splice caps into system.

8. When do you prime the charge with the electrical firing system?

   a. In advance.
   b. Ready to detonate.
   c. Whenever you want to.

9. What do you do before activating the blasting machine?

10. What do you do when you activate the blasting machine and nothing happens?

    a. Recheck the circuit and try again.
    b. Install new priming adapters.
    c. Wait for awhile because there is moisture on the firing wire.

ANNEX: D-I

STUDENT ANSWER SHEET

(PART I)

TASK #051-193-1004 Prepare an Electric Firing System

POI NO. 01-03

NOTE: This answer sheet is to be reproduced in sufficient quantities to satisfy testing requirements.

_____ _____

(Date) (Student's Name)

ANSWER SHEET

FOR

PREPARE AN ELECTRIC FIRING SYSTEM

NAME _____ DATE _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

_____ _____

8-10 CORRECT
GO

0-7 CORRECT
NO-GO

_____ _____

_____ _____

Instructor's Signature Date

12B1/X

ANNEX: E

STUDENT TEST

(PART II HANDS-ON)

TASK #091-193-1004 Prepare an Electrical Firing System

POI NO. 01-03

THIS TEST IS TO BE REPRODUCED LOCALLY

WARNING: Access to this material is restricted to management personnel prior to actual student testing.

_____ _____

(Date) (Student's Name)

STUDENT TEST - ELECTRIC FIRING SYSTEM

INSTRUCTIONS TO THE STUDENT: The scorer will read these exact words aloud:

"LET ME HAVE YOUR ATTENTION. AT THIS STATION, YOU ARE TO PREPARE AN ELECTRIC FIRING SYSTEM. ALL EQUIPMENT YOU WILL NEED TO PERFORM THE TASK IS ON HAND AND IN GOOD WORKING CONDITION. YOU HAVE 15 MINUTES TO PREPARE THE FIRING SYSTEM. TELL ME WHEN YOU HAVE COMPLETED INSTALLING THE SYSTEM. IF YOU HAVE NOT COMPLETED INSTALLING THE SYSTEM IN 15 MINUTES, YOU WILL BE RATED NO-GO. I WILL TELL YOU WHEN THE TIME IS UP. I CANNOT HELP YOU IN ANY WAY EXCEPT TO EXPLAIN WHAT IS REQUIRED" (Pause) "DO YOU UNDERSTAND WHAT IS REQUIRED?" (If the student does not understand, repeat the instructions. If the student still does not understand, tell him to restudy the lesson.) Pause at least 5 seconds then say, "YOU HAVE 15 MINUTES TO INSTALL AND RECOVER THE ELECTRIC FIRING SYSTEM WHEN I GIVE THE COMMAND, BEGIN". Begin timing when you give the command. If the student has not completed the task within 10 minutes, tell him he has 5 minutes left. If he has not completed the test within 15 minutes, announce loudly enough for him to hear "STOP", have him restudy the lesson. If the student finishes the test within the allotted time and otherwise receives a GO, direct him to the next lesson.

TASK

PREPARE AN ELECTRIC FIRING SYSTEM

Student Grading Sheet

The following performance measures will be used to evaluate student during the preparation of an Electric Firing System inert. Observe Student's actions and record his performance.

Performance Measure	YES	NO
1. Lay out firing wire from charges to the firing position.		
2. a. Test firing wire for continuity.		
b. Test for shorts.		
c. Twist ends of wire together.		
3. a. Test blasting caps.		
b. Place in hole or under sandbag.		
c. Twist ends of capwires together.		
4. Connect blasting cap lead wires to firing wire.		
5. Insert caps into charge and secure.		
6. Test entire circuit, twist wire ends together.		
7. Test blasting machine.		
8. Connect firing wire to blasting machine.		

	YES	NO
9. Clear area and yell "FIRE-in-the-hole" three times.		
10. When clear operate blasting machine causing detonations.		

STANDARD: Student is scored GO if he has a YES response to all the performance measures. A NO to any performance measure will result in the student receiving a NO-GO for the test; explain why he received a NO-GO and have him review the lesson; then test him again.

Written Test		Performance	
GO	NO-GO	GO	NO-GO
Circle One		Circle One	

Reason for a NO-GO _____

_____

_____

_____ _____

Date Manager's Signature

_____

Student's Name

12B1/Z

ANNEX: F

STUDENT TEST

PART I

TASK # 051-193-1007 Prepare a Detonating Cord Firing System

POI NO. 01-04

WARNING: Access to this material is restricted to management personnel prior to actual student testing. Students are not to write in this test booklet or keep this booklet after testing has been completed. Student responses are to be recorded on the student answer sheet.

TEST INSTRUCTIONS

FOR

DETONATING CORD FIRING SYSTEM

Managers/Instructors: Give the student the test booklet and answer sheet. Supervise the student while he is taking the test. You may not answer questions or give the student reference material. When the student has completed the test, you must grade it and rate the student GO or NO-GO. A GO is given when a student correctly answers eleven or more questions. GO students will be issued the inert material to prepare a detonating cord firing system. NO-GO ratings are issued to students who correctly answer less than eight questions. NO-GO students should be directed to restudy the lesson.

TEST QUESTIONS

FOR

PREPARE A DETONATING CORD FIRING SYSTEM

Student Instructions: DO NOT WRITE IN THIS TEST. Put ALL answers on the answer sheet given to you by the manager.

PRE/POSTTEST

HOW TO PREPARE A DETONATING CORD FIRING SYSTEM

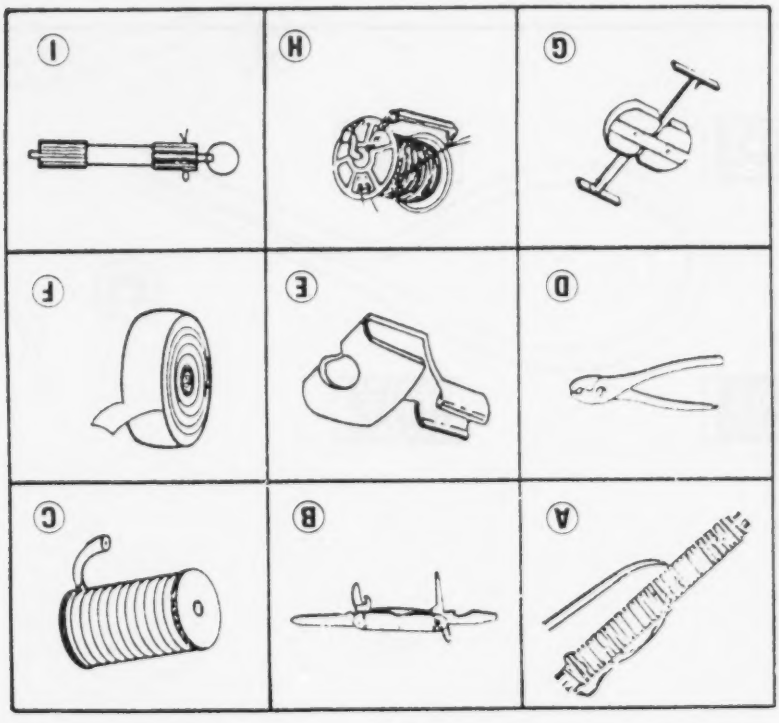
(Do Not Write On This Paper)

This Pre/Posttest consists of thirteen questions and will test every training objective in the lesson. Write your answers on the answer sheet. After completing the Pre/Posttest, take the test booklet and answer sheet to the instructor.

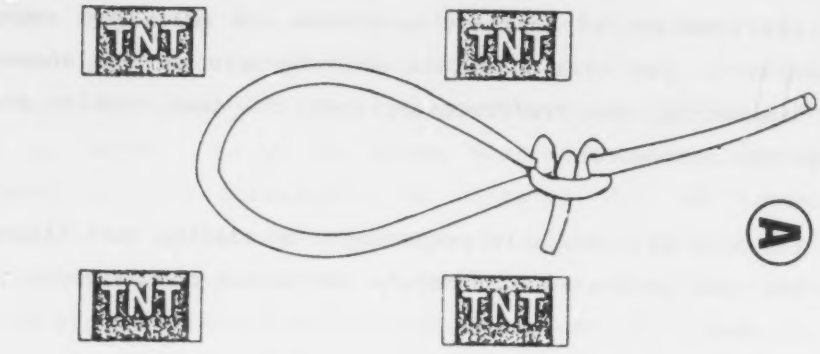
1 Here are the four main steps in preparing a detonating cord firing system. Put them in the correct order. Write out the answers; do not use letters.

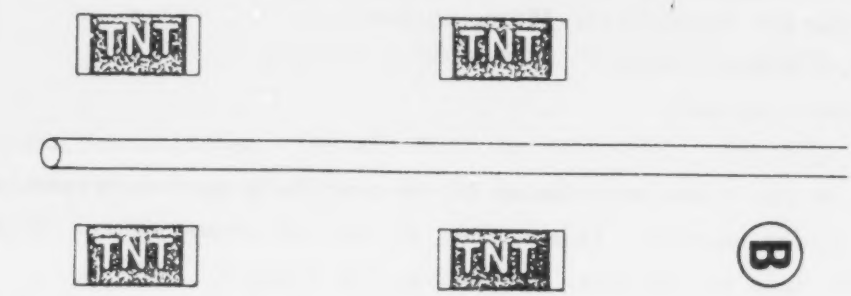
a. Prime.
b. Connect non-electric firing system.
c. Lay branch lines.
d. Lay ring main.

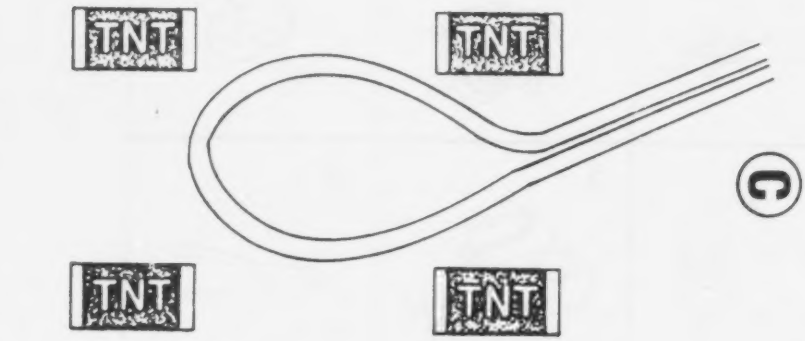
2. Which of the items shown below do you need to prepare a detonating cord firing system? Select four of the six items shown. Write out the name of the item. Do not use the letters.



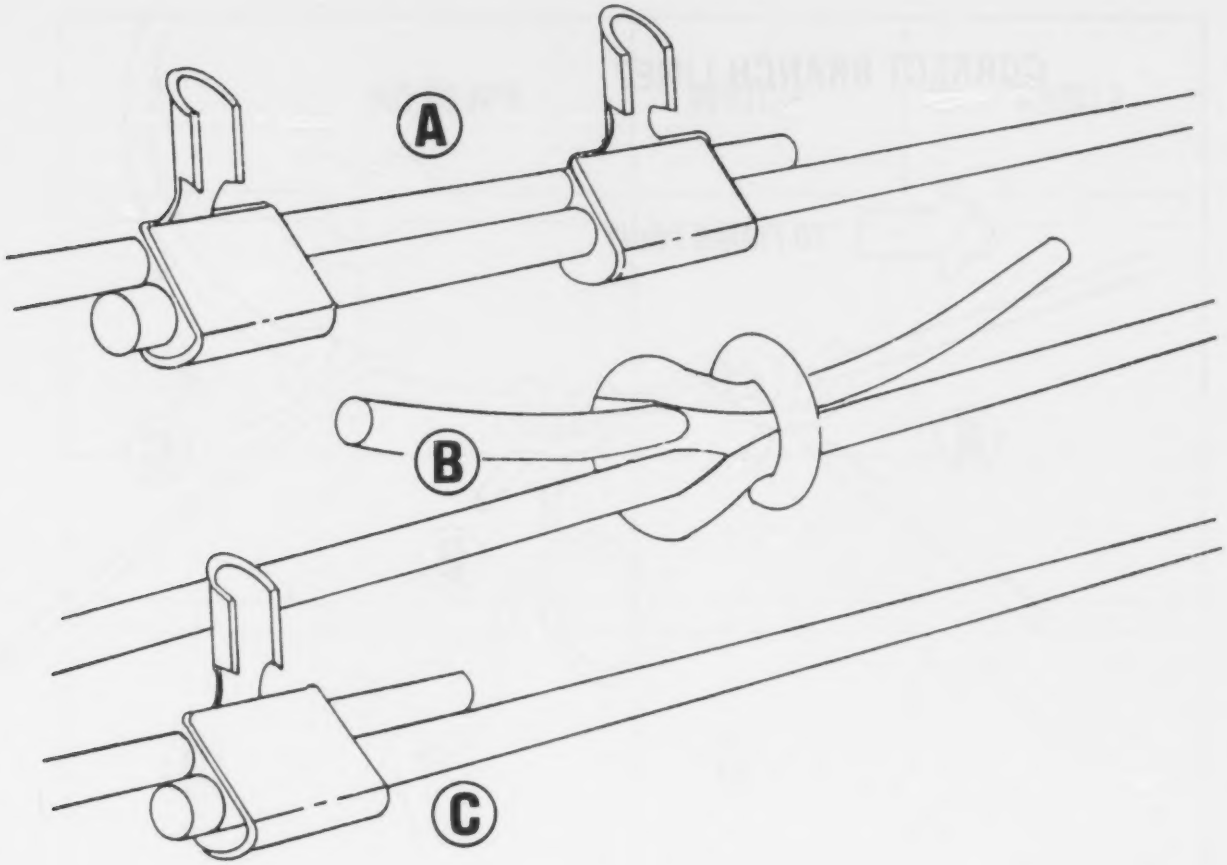
3. Which is the best way to lay a ring main?



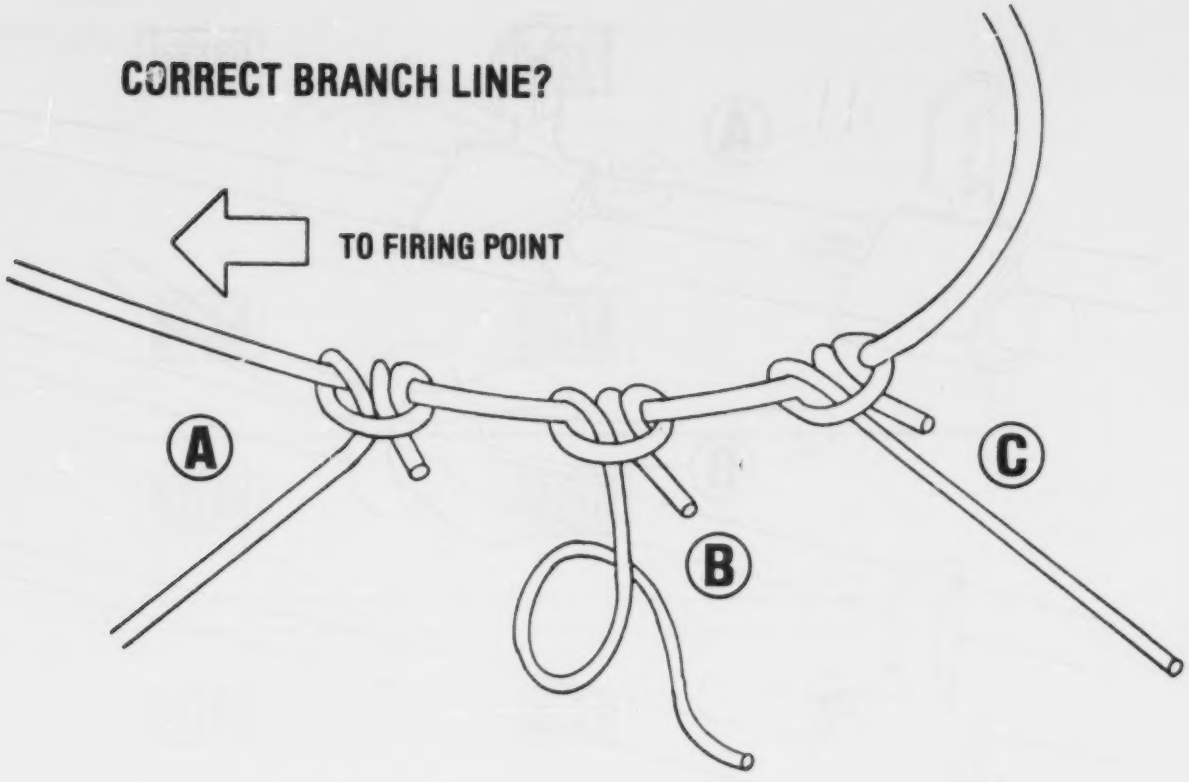




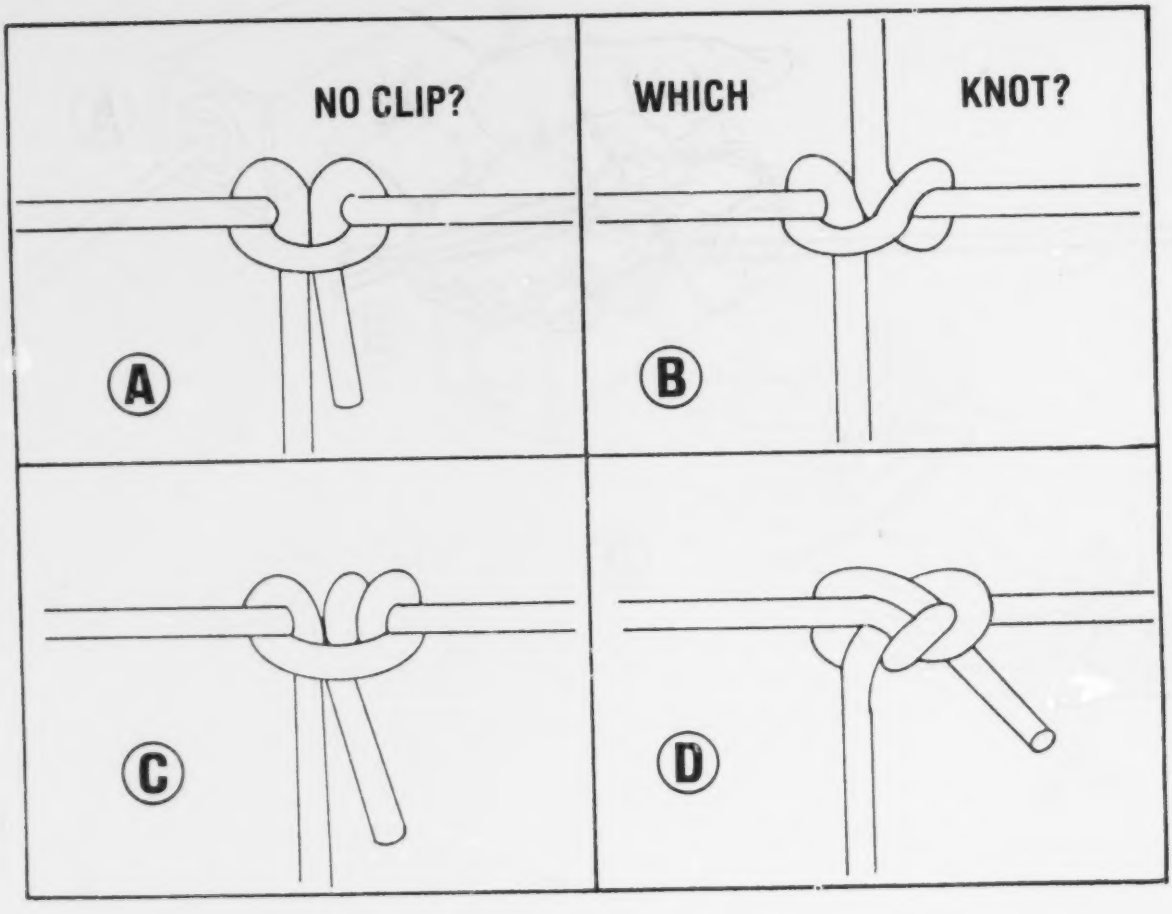
4. Which of the three shown below, is the best splice?



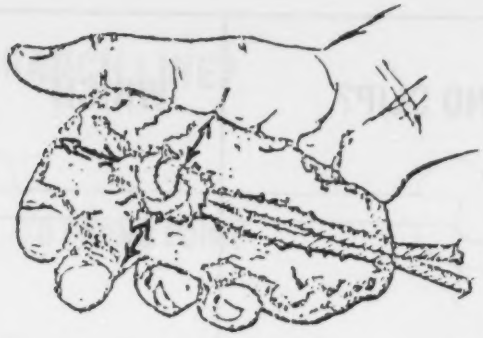
5. Which way do you lay out the branch lines when connecting them to the ring main?



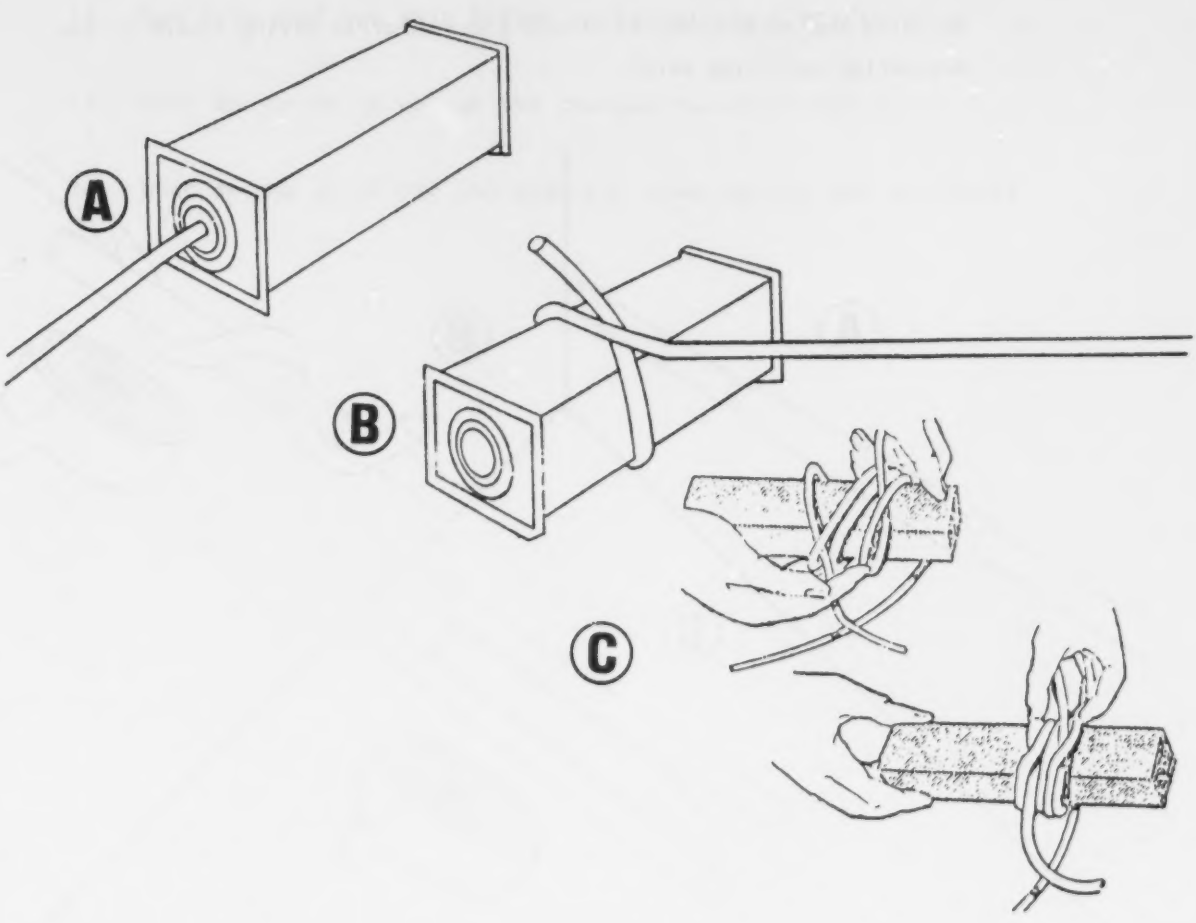
6. If you have to make a branch line connection without a clip, which knot do you make?



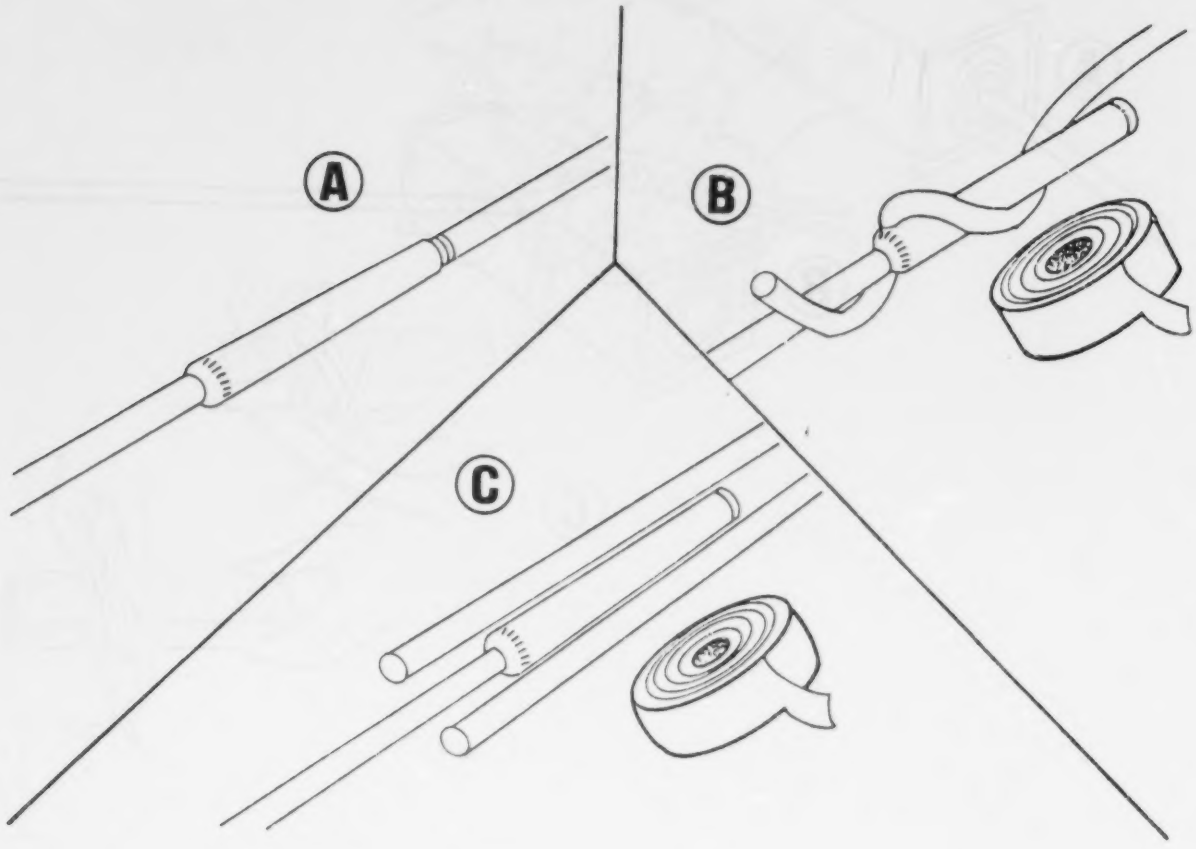
7. When you prime C-4 plastic explosive, how much explosive do you allow along the sides and the end of the detonating cord knot?



8. Using Detonating Cord which is the best way to prime a block charge?



9. Which is the correct way to attach a non-electric firing system to the detonating cord ring main?



10. Before you pull (fire) your shot (charge), what warning do you give?

11. How long must you wait before investigating a misfire?

12. What do you do if one of the charges has misfired?

13. What do you do if the non-electric blasting cap has misfired?

12B1/S

ANNEX: F-I

STUDENT ANSWER SHEET

(PART I)

TASK #091-193-1007 Prepare a Detonating Cord Firing System

POI NO. 01-04

NOTE: This answer Sheet is to be reproduced in sufficient quantities to satisfy testing requirements.

_____ _____

(Date) (Student's Name)

ANSWER SHEET

FOR

PREPARING A DETONATING CORD FIRING SYSTEM

1. _____
_____
_____
_____

2. _____
_____
_____
_____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____
_____

11. _____

12. _____
_____

13. _____
_____

_____

11-13 CORRECT

GO

_____

0-10 CORRECT

NO-GO

_____

Instructor's Signature

_____

Date

_____

Student's Name

12B1/AA

ANNEX: G

STUDENT TEST

(PART II HANDS-ON)

TASK #091-193-1007 Detonating Cord Firing System

POI NO. 01-04

THIS TEST IS TO BE REPRODUCED LOCALLY

WARNING: Access to this material is restricted to management personnel prior to actual student testing.

_____ _____

(Date) (Student's Name)

INSTRUCTIONS TO THE STUDENT: The scorer will read these suggested words aloud:

"LET ME HAVE YOUR ATTENTION. AT THIS STATION, YOU ARE TO INSTALL A DETONATING CORD FIRING SYSTEM. ALL EQUIPMENT YOU WILL NEED TO PERFORM THE TASK IS ON HAND AND IN GOOD WORKING CONDITION. YOU HAVE 15 MINUTES TO INSTALL AND RECOVER THE FIRING SYSTEM. TELL ME WHEN YOU HAVE COMPLETED INSTALLING THE SYSTEM. IF YOU HAVE NOT COMPLETED THE TASK IN 15 MINUTES, YOU WILL BE RATED NO-GO. I WILL TELL YOU WHEN THE TIME IS UP. I CANNOT HELP YOU IN ANY WAY EXCEPT TO EXPLAIN WHAT IS REQUIRED" (Pause) "DO YOU UNDERSTAND WHAT IS REQUIRED?" (If the student does not understand, repeat the instructions. If the student still does not understand, tell him to restudy the lesson.) Pause at least 5 seconds then say, "YOU HAVE 15 MINUTES TO INSTALL AND RECOVER THE DETONATING CORD FIRING SYSTEM WHEN I GIVE THE COMMAND, BEGIN". Begin timing when you give the command. If the student has not completed the task within 10 minutes, tell him he has 5 minutes left. If he has not completed the test within 15 minutes, announce loudly enough for him to hear "STOP", have him restudy the lesson. If the student finishes the test within the allotted time and otherwise receives a GO, direct him to the next lesson.

CHECK LIST FOR D-CORD FIRING SYSTEM

Did the Student:	YES	NO
1. Cut and discard 6 inches of D-cord?		
2. Lay the ring main correctly?		
3. Attach branch lines correctly?		
4. Prime a block charge?		
5. Tie a Clove Hitch with 2 extra turns?		
6. Connect to electric on non-electric firing system?		
7. Tape detonating cord to cap?		

STANDARDS: Student is scored GO if he has a YES response to all the performance measures. A NO to any performance measure will result in the student receiving a NO-GO for the test; in this case, explain why he received a NO-GO and have him review the lesson; then test him again. GO students proceed to the next lesson.

_____ GO

_____ NO-GO

_____ Instructor's Name

_____ Date

REASON FOR NO-GO _____

_____

_____

12B1/BB

_____ Student's Name

ANNEX: H

STUDENT TEST

TASK #051-193-1011 Prepare a Dual Firing System

POI NO. 01-05

WARNING: Access to this material is restricted to management personnel prior to actual student testing. Students are not to write in this booklet or keep this booklet after testing has been completed. Student responses are to be recorded on the student answer sheet.

TEST

Circle the letter of the most correct answer on the answer sheet.

DO NOT WRITE ON TEST

1. A Dual Firing System is:

   a. Electric
   b. Non-Electric
   c. Combination
   d. All of the above

2. A Dual Firing System:

   a. Uses more Equipment
   b. Wastes Equipment
   c. Increases Success
   d. Does Good Work

3. A Dual Firing System Must Contain:

   a. Two Independent Systems
   b. Caps
   c. Ring Mains
   d. Two Extra Fuses

4. Which Dual Firing System Allows the Best Control?

   a. Non-Electric
   b. Detonating Cord
   c. Electric
   d. All of the above

5. On a combination Dual Firing System, which system is fired first?

   a. Electric
   b. Detonating Cord
   c. Non-Electric
   d. Makes no difference

6. How many charges can be safely fired using dual priming?

a. Ten
b. One
c. 50
d. No limit

7. A Dual Firing System cuts down the chance for a:

a. Fault
b. Misfire
c. Mistake
d. Dud

8. When firing a lot of charges at the same time, detonating cord:

a. Ties all charges together
b. Uses less time
c. Is a ring main
d. Doesn't work

9. A single bullet or shell fragment cannot stop a Dual Firing System because:

a. Sensitivity
b. It's a good system
c. Splices
d. Two separate systems

10. For underwater or underground blasting the best way to prime the charge is with:

a. Electric caps
b. Non-electric caps
c. Detonating cord
d. None of the above

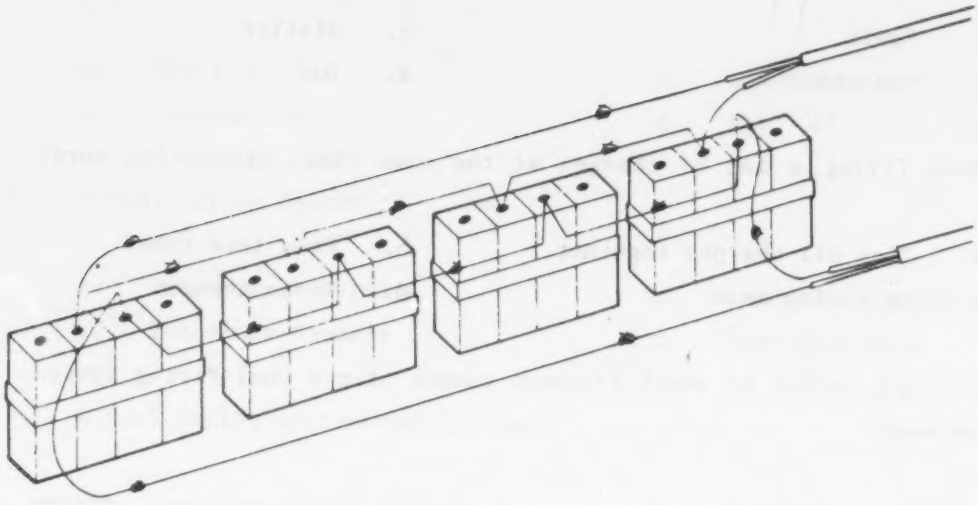
11. This is a:

A. Electric Dual Firing System

B. Non-Electric Dual Firing System

C. Combination Dual Firing System

D. Western Union Firing System



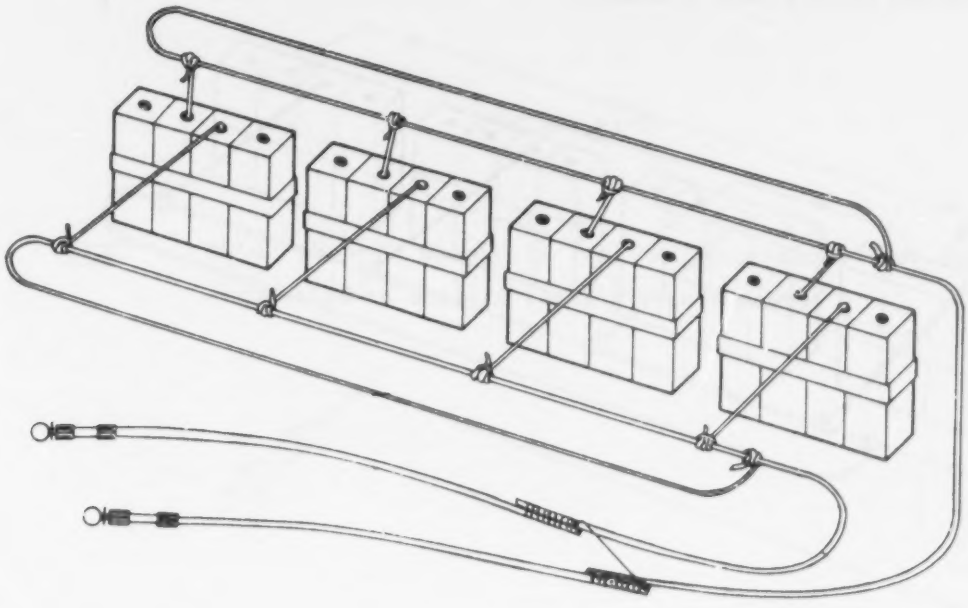
12. This is a:

A. Electric Dual Firing System

B. Combination Dual Firing System

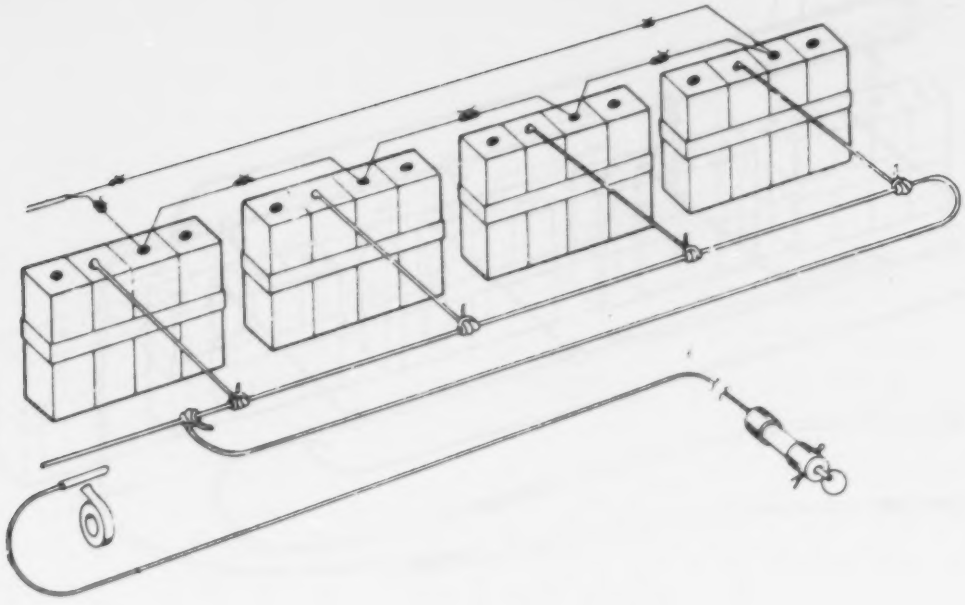
C. Combined Independent Firing System

D. Non-Electric Dual Firing System



13. This is a:

A. Combination Dual Firing System
B. Non-Electric Firing System
C. Electric Dual Firing System
D. Western Union Dual Firing System



12BR4/R

ANNEX: H-I

STUDENT ANSWER SHEET

TASK #051-193-1011 Prepare a Dual Firing System

POI NO. 01-05

NOTE: This answer sheet is to be reproduced in sufficient quantities to satisfy testing requirements.

_____ _____

(Date) (Student's Name)

Answer Sheet

Dual Firing Systems

Circle the letter of the most correct answer.

1.	A	B	C	D	8.	A	B	C	D
2.	A	B	C	D	9.	A	B	C	D
3.	A	B	C	D	10.	A	B	C	D
4.	A	B	C	D	11.	A	B	C	D
5	A	B	C	D	12.	A	B	C	D
6.	A	B	C	D	13.	A	B	C	D
7.	A	B	C	D					

When you have circled the correct answers, take test booklet and answer sheet to the manager.

GO NO-GO (Circle One)

_____ _____

Manager's Signature Date

_____

Student's Name

12B4/S

ANNEX: I

STUDENT TEST

(HANDS-ON)

TASK: #091-193-1010 US Firing Devices

POI NO. 01-06

THIS TEST IS TO BE REPRODUCED LOCALLY

WARNING: Access to this material is restricted to management personnel prior to actual student testing.

INSTRUCTIONS TO THE MANAGER:

The test for the firing device lessons are hands-on test. There are four parts to the test that correspond to the four parts of the lesson. The four parts of the tests are as follows:

PART	TEST
I	M1 Firing Device
II	M1A1 Firing Device
III	M3 Firing Device
V	M5 Firing Device

There is no sequence in which the individual parts of the test may be taken. They are to be taken one part at a time as the student completes the corresponding part of the lesson material.

Student check sheets and instructions to the student for each part of the test is contained at the beginning of each of the lesson parts. A student check sheet to record student performance on each of the firing devices is included.

STUDENT TEST RESULTS
US FIRING DEVICES

_____

Student's Name

This form will be used for all four tests. PASS FAIL

M1 Pull: Install and Arm _____

Disarm and Remove _____

Test Date _____

M1A1 Pressure Install and Arm _____

Disarm and Remove _____

Test Date _____

M3 Pull Release Install and Arm _____

Disarm and Remove _____

Test Date _____

M5 Pressure Release Install and Arm _____

Disarm and Remove _____

Test Date _____

GO NO-GO

_____

Signature of Manager

STANDARDS: GO Students will be directed to next cluster NO-GO students will be directed to restudy that part where they failed and retested. One hundred percent (100%) accuracy is a GO; any less is a NO-GO.

STUDENT TEST - FIRING DEVICE

PART I - M1 Firing Device

INSTRUCTIONS TO THE STUDENT: The scorer will read these suggested words aloud:

"LET ME HAVE YOUR ATTENTION. AT THIS STATION, YOU ARE TO INSTALL AND RECOVER THE M1 FIRING DEVICE. ALL EQUIPMENT YOU WILL NEED TO PERFORM THE TASK IS ON HAND AND IN GOOD WORKING CONDITION. YOU HAVE 10 MINUTES TO INSTALL AND RECOVER THE M1 FIRING DEVICE. TELL ME WHEN YOU HAVE COMPLETED INSTALL THE DEVICE AND WHEN YOU HAVE COMPLETED RECOVERING THE DEVICE. IF YOU HAVE NOT COMPLETED INSTALLING AND RECOVERING THE DEVICE IN 10 MINUTES, YOU WILL BE RATED NO-GO. I WILL TELL YOU WHEN THE TIME IS UP. I CANNOT HELP YOU IN ANY WAY EXCEPT TO EXPLAIN WHAT IS REQUIRED" (Pause) "DO YOU UNDERSTAND WHAT IS REQUIRED?" (If the student does not understand, repeat the instructions. If the student still does not understand, tell him to restudy the lesson.) Pause at least 5 seconds then say, "YOU HAVE 10 MINUTES TO INSTALL AND RECOVER THE M1 FIRING DEVICE WHEN I GIVE THE COMMAND, BEGIN". Begin timing when you give the command. (Count only the time the student is actively engaged in installing and recovering the firing device. Any time used by the instructor to check installation of the device is not to be charged to the student. Timing will resume when the installation has been checked and the student begins to recover the device.) If the student has not completed the task within 7 minutes, tell him he has 3 minutes left. If he has not completed the test within 10 minutes, announce loudly enough for him to hear "STOP", have him restudy the lesson. If the student finishes the test within the allotted time and otherwise receives a GO, direct him to the next lesson.

PERFORMANCE CHECKLIST

For Installing and Arming M1 Pull Firing Device

Did the student	YES	NO
1. Inspect the firing device?		
2. Inspect standard base?		
3. Screw base to device?		
4. Remove protective cap?		
5. Inspect dummy blasting cap?		
6. Crimp cap to base?		
7. Inspect demolition block?		
8. Screw device to block?		
9. Drive stakes?		
10. Anchor block?		
11. Anchor tripwire?		
12. Attach tripwire to device? Left Loose?		
13. Camouflage?		
14. Remove locking safety? Come out freely?		

15. Remove positive safety? Come out freely? _____

16. Put safety in pocket? _____

17. Clear area (depart, leave, etc.)? _____

PERFORMANCE CHECKLIST

For Disarming and Removing M1 Pull Firing Device

Did the Student:	YES	NO
1. Approach and locate device?		
2. Check for damage or tampering?		
3. Replace positive safety?		
4. Replace locking safety?		
5. Cut tripwire?		
6. Remove device from block?		
7. Remove base from device?		
8. Remove stakes?		
9. Roll up tripwire?		
10. Secure equipment and materials?		
11. Police Area?		

Mark results on test result sheet (Next Page)

Results sheet follows student through all four parts of the lesson.

STUDENT TEST - FIRING DEVICE

PART II - M1A1 Firing Device

INSTRUCTIONS TO THE STUDENT: The scorer will read these suggested words aloud:

"LET ME HAVE YOUR ATTENTION. AT THIS STATION, YOU ARE TO INSTALL AND RECOVER THE M1A1 FIRING DEVICE. ALL EQUIPMENT YOU WILL NEED TO PERFORM THE TASK IS ON HAND AND IN GOOD WORKING CONDITION. YOU HAVE 10 MINUTES TO INSTALL AND RECOVER THE M1A1 FIRING DEVICE. TELL ME WHEN YOU HAVE COMPLETED INSTALL THE DEVICE AND WHEN YOU HAVE COMPLETED RECOVERING THE DEVICE. IF YOU HAVE NOT COMPLETED INSTALLING AND RECOVERING THE DEVICE IN 10 MINUTES, YOU WILL BE RATED NO-GO. I WILL TELL YOU WHEN THE TIME IS UP. I CANNOT HELP YOU IN ANY WAY EXCEPT TO EXPLAIN WHAT IS REQUIRED" (Pause) "DO YOU UNDERSTAND WHAT IS REQUIRED?" (If the student does not understand, repeat the instructions. If the student still does not understand, tell him to restudy the lesson.) Pause at least 5 seconds then say, "YOU HAVE 10 MINUTES TO INSTALL AND RECOVER THE M1A1 FIRING DEVICE WHEN I GIVE THE COMMAND, BEGIN". Begin timing when you give the command. (Count only the time the student is actively engaged in installing and recovering the firing device. Any time used by the instructor to check installation of the device is not to be charged to the student. Timing will resume when the installation has been checked and the student begins to recover the device.) If the student has not completed the task within 7 minutes, tell him he has 3 minutes left. If he has not completed the test within 10 minutes, announce loudly enough for him to hear "STOP", have him restudy the lesson. If the student finishes the test within the allotted time and otherwise receives a GO, direct him to the next lesson.

Performance Checklist

For Installing and Arming M1A1 Pressure Firing Device

Did the Student:	YES	NO
1. Inspect firing device?		
2. Inspect standard base?		
3. Screw base to device?		
4. Remove protective cap?		
5. Inspect dummy blasting cap?		
6. Crimp cap to base?		
7. Inspect demolition block?		
8. Screw device to block?		
9. Anchor device? Build up under device if needed?		
10. Anchor block?		
11. Cover pressure plate if required?		
12. Camouflage?		
13. Remove locking safety? Come out freely?		
14. Remove positive safety? Come out freely?		

15. Put safety in pocket? _____

16. Clear area (depart, leave etc.) _____

Performance Checklist

For Disarming and Removing M1A1 Pressure Firing Device

Did the Student:	YES	NO
1. Approach and locate device?		
2. Check for damage or tampering?		
3. Replace positive safety?		
4. Replace locking safety?		
5. Remove device from block 2?		
6. Remove base from device?		
7. Secure equipment and materials?		
8. Police area?		

STUDENT TEST - FIRING DEVICE

PART III - M3 Firing Device

INSTRUCTIONS TO THE STUDENT: The scorer will read these suggested words aloud:

"LET ME HAVE YOUR ATTENTION. AT THIS STATION, YOU ARE TO INSTALL AND RECOVER THE M3 FIRING DEVICE. ALL EQUIPMENT YOU WILL NEED TO PERFORM THE TASK IS ON HAND AND IN GOOD WORKING CONDITION. YOU HAVE 10 MINUTES TO INSTALL AND RECOVER THE M3 FIRING DEVICE. TELL ME WHEN YOU HAVE COMPLETED INSTALL THE DEVICE AND WHEN YOU HAVE COMPLETED RECOVERING THE DEVICE. IF YOU HAVE NOT COMPLETED INSTALLING AND RECOVERING THE DEVICE IN 10 MINUTES, YOU WILL BE RATED NO-GO. I WILL TELL YOU WHEN THE TIME IS UP. I CANNOT HELP YOU IN ANY WAY EXCEPT TO EXPLAIN WHAT IS REQUIRED" (Pause) "DO YOU UNDERSTAND WHAT IS REQUIRED?" (If the student does not understand, repeat the instructions. If the student still does not understand, tell him to restudy the lesson.) Pause at least 5 seconds then say, "YOU HAVE 10 MINUTES TO INSTALL AND RECOVER THE M3 FIRING DEVICE WHEN I GIVE THE COMMAND, BEGIN". Begin timing when you give the command. (Count only the time the student is actively engaged in installing and recovering the firing device. Any time used by the instructor to check installation of the device is not to be charged to the student. Timing will resume when the installation has been checked and the student begins to recover the device.) If the student has not completed the task within 5 minutes, tell him he has 5 minutes left. If he has not completed the test within 10 minutes, announce loudly enough for him to hear "STOP", have him restudy the lesson. If the student finishes the test within the allotted time and otherwise receives a GO, direct him to the next lesson.

Performance Checklist

For Installing and Arming an M3 Pull-Release Firing Device

Did the Student:	YES	NO
1. Inspect the firing device?		
2. Inspect standard base?		
3. Screw base to device?		
4. Remove protective cap?		
5. Inspect dummy blasting cap?		
6. Crimp cap to base?		
7. Inspect demolition block?		
8. Screw device to block?		
9. Drive stakes?		
10. Anchor block?		
11. Anchor tripwire?		
12. Attach tripwire to device? Tighten?		
13. Camouflage?		
14. Remove locking safety? Come out freely?		
15. Remove positive safety? Come out freely?		
16. Put safety in pocket?		
17. Clear area (depart, leave, etc.)?		

Performance Checklist

For Disarming and Removing an M3 Pull-Release Firing Device

Did the Student:	YES	NO
1. Approach and locate device?		
2. Check for damage or tampering?		
3. Replace positive safety?		
4. Replace locking safety?		
5. Cut tripwire?		
6. Remove device from block?		
7. Remove base from device?		
8. Remove stakes?		
9. Roll up tripwire?		
10. Secure equipment and materials?		
11. Police Area?		

STUDENT TEST - FIRING DEVICE

PART V - M5 Firing Device

INSTRUCTIONS TO THE STUDENT: The scorer will read these suggested words aloud:

"LET ME HAVE YOUR ATTENTION. AT THIS STATION, YOU ARE TO INSTALL AND RECOVER THE M5 FIRING DEVICE. ALL EQUIPMENT YOU WILL NEED TO PERFORM THE TASK IS ON HAND AND IN GOOD WORKING CONDITION. YOU HAVE 10 MINUTES TO INSTALL AND RECOVER THE M5 FIRING DEVICE. TELL ME WHEN YOU HAVE COMPLETED INSTALL THE DEVICE AND WHEN YOU HAVE COMPLETED RECOVERING THE DEVICE. IF YOU HAVE NOT COMPLETED INSTALLING AND RECOVERING THE DEVICE IN 10 MINUTES, YOU WILL BE RATED NO-GO. I WILL TELL YOU WHEN THE TIME IS UP. I CANNOT HELP YOU IN ANY WAY EXCEPT TO EXPLAIN WHAT IS REQUIRED" (Pause) "DO YOU UNDERSTAND WHAT IS REQUIRED?" (If the student does not understand, repeat the instructions. If the student still does not understand, tell him to restudy the lesson.) Pause at least 5 seconds then say, "YOU HAVE 10 MINUTES TO INSTALL AND RECOVER THE M5 FIRING DEVICE WHEN I GIVE THE COMMAND, BEGIN". Begin timing when you give the command. (Count only the time the student is actively engaged in installing and recovering the firing device. Any time used by the instructor to check installation of the device is not to be charged to the student. Timing will resume when the installation has been checked and the student begins to recover the device.) If the student has not completed the task within 5 minutes, tell him he has 5 minutes left. If he has not completed the test within 10 minutes, announce loudly enough for him to hear "STOP", have him restudy the lesson. If the student finishes the test within the allotted time and otherwise receives a GO, direct him to the next lesson.

Performance Checklist

For Installing and Arming an M5 Pressure-Release Firing Device

Did the Student:	YES	NO
1. Inspect firing device?		
2. Inspect standard base?		
3. Screw base to device?		
4. Remove protective cap?		
5. Inspect dummy blasting cap?		
6. Crimp cap to base?		
7. Inspect demolition block?		
8. Screw device to block?		
9. Anchor block?		
10. Secure weight on device?		
11. Replace safeties with wires if required?		
12. Camouflage?		
13. Remove locking safety? Come out freely?		
14. Remove positive safety? Come out freely?		
15. Put safety in pocket?		
16. Clear area (depart, leave, etc.)?		

Performance Checklist

For Disarming and Removing an M5 Pressure-Release Firing Device

Did the Student:	YES	NO
1. Approach and locate device?		
2. Check for damage or tampering?		
3. Replace positive safety?		
4. Replace locking safety?		
5. Remove device from block?		
6. Remove base from device?		
7. Secure equipment and materials?		
8. Police Area?		

12B6/FF

☆ U.S. Government Printing Office : 1984 - 448-385/10978